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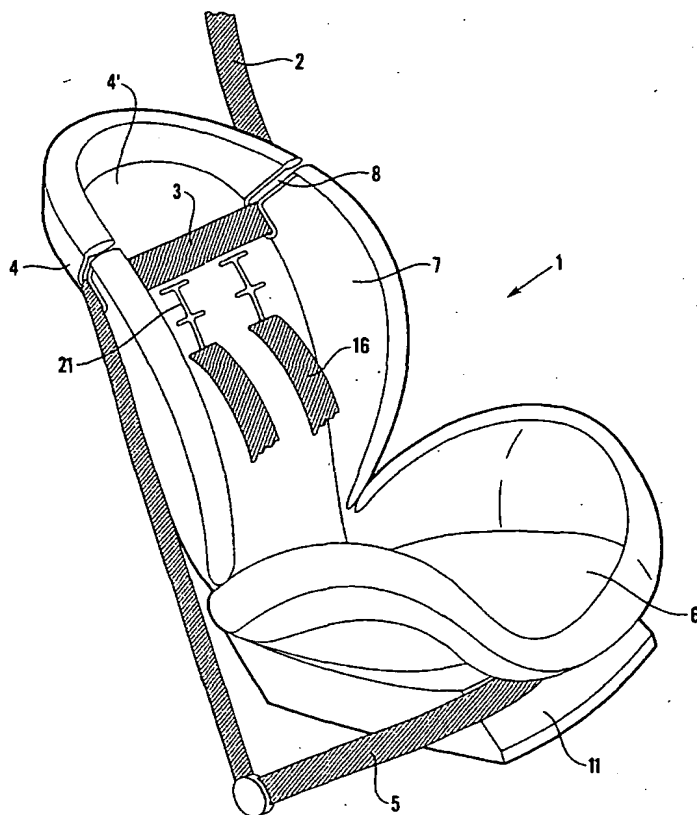
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(54) Title: SYSTEM FOR ATTACHING A CHILD'S SEAT AND AN ADJUSTING DEVICE



(57) Abstract: A mounting system for attaching a child's seat (1) in a car seat, where a seat belt (2) is employed for attaching a child's seat. A first portion (3) of the seat belt is positioned substantially horizontally over a forwardly facing portion of the child seat's backrest (4). The child seat's backrest (4) has receiving portions for receiving the seat belt's first portion (3). The mounting system is further characterised in that a second portion (5) of the seat belt is positioned substantially horizontally over or under a forwardly facing part of the child seat's sitting portion (6). The invention further comprises an adjustment device for adjusting the child seat's safety harness (16), the child's safety harness being inserted through cut-outs (20) in the child seat's backrest, characterised in that the adjustment device (1) is designed with a gripping portion (17) and a portion (19) for mounting at least one of the child's safety harnesses (16). The adjustment device (1) is further mounted on the child seat's backrest (4) and can be moved in such a manner that the child's safety harness (16) is arranged in different positions along the child seat's backrest (4).

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System for attaching a child's seat and an adjusting device

The present invention relates to a mounting system for attaching a child's seat in a car and an adjustment device for adjusting the child seat's safety harness.

One of the most crucial safety factors when transporting children by car is the attachment of the child's seat to the car seat. There are currently a number of different ways of implementing this attachment. Many of these attachment methods involve operational steps that are felt by the user to be unnecessarily complicated. Many of the known attachment devices also have the potential for improvement purely from the safety point of view.

During user tests of child's seats it has been shown that the attachment of the child's seat to the car seat is carried out incorrectly in a great many cases, and this misuse results in a reduction in safety. It is therefore an object of the invention to provide a simple method of attaching a child's seat to the car seat that is easy to check, so that it is easy for the user to ascertain whether the child's seat is correctly attached.

Various types of solutions are previously known for attaching a child's seat to the car seat both by means of an attachment procedure involving the seat belt in the car and by the use of separate mechanisms for attachment to the car seat.

The use is known of a number of different types of mechanisms for attaching the rear of the child's seat to the car seat. The rear of the child's seat may, for example, be provided with loop devices for mounting to the car seat. However, this is a highly impractical and cumbersome method of attaching the seat. When using devices that are mounted to the rear of the child's seat it is also difficult to check whether the child's seat is actually correctly attached.

In other known systems use is made of the actual seat belt, which is normally used by adult passengers, to mount the child's seat.

In publication DE 3703742 an example is disclosed of attachment of a child's seat by means of the seat belt. In this case the seat belt is fastened over the child's seat with a portion diagonally over the child's seat and the other

portion horizontally over the central portion of the child's seat. In this system the seat belt serves two purposes; both to keep the child's seat in place in the car seat and to contribute towards strapping the child in safely. The system does not work satisfactorily from the safety point of view, since the child is
5 not strapped into the child's seat by a five-point belt, but only kept in place by a horizontal barrier in addition to a part of the seat belt's diagonal portion.

The object of the invention is to provide a mounting system for attaching a child's seat in a car that to the greatest possible extent reduces forward movement of the child's body when the car is braked. In addition the
10 mounting system should be simple to use with little potential for misuse.

The invention's object is achieved with respect to a mounting system in accordance with the introduction to the independent claim 1 with characterising features as indicated in the independent patent claim's characteristic. The embodiments of the invention are indicated in the
15 dependent patent claims 2-7.

When using child's seats, however, it may sometimes also be necessary to adjust the attachment of the child's safety harness to the child seat's backrest in relation to the child's shoulder height in a sitting position. This is an adjustment that is necessary when the child has grown or if the child's seat is
20 used by several children of different sizes.

It is known in the prior art for the child's safety harness to be fixed to the backrest in through-going openings provided in the backrest. When the child's safety harness has to be adjusted with regard to height according to the prior art, the safety harness has to be removed from the opening
25 concerned and reinserted through other openings in the backrest. This is a time-consuming method of adjusting the safety harness, and is manifestly far from user-friendly.

It is therefore a further object of the present invention to provide a device that facilitates the adjustment of the shoulder height of the child's safety
30 harness. The object is achieved with an adjustment device according to the independent claim 6, with embodiments according to the following dependent patent claims.

The present-day requirement for child's seats is that the forward movement to which the child should be exposed during braking should be limited to 55

cm. Tests have shown that by means of the present invention this distance is reduced to 48 cm. By means of the attachment system according to the present invention the remaining 7 cm can be exploited during braking, thus reducing the possibility of the child being subjected to severe forces and stresses in the neck and head area.

The attachment system according to the invention will be felt to be user-friendly since all the attachment of the child's seat is carried out in a simple manner on the front of the child's seat. Compared with known attachment systems where the actual attachment takes place at the back of the child's seat, this method of mounting the child's seat will be perceived as easy to perform. In addition it is an advantage that it is easy to ensure that the child's seat is actually secured, since only a glance is required to check whether the child's seat is secured by the seat belt.

The mounting system for the child's seat according to a preferred embodiment of the invention employs the car's three-point seat belts. The child's seat is placed in the car seat and the seat belt is pulled over the child's seat with a first portion of the seat belt being positioned horizontally over the forwardly facing portion of the child's seat's backrest. A second portion of the seat belt is placed below or above the child seat's sitting portion.

In a second application of the child's seat the seat belt located in the middle of the back seat can be placed below the child seat's sitting portion, while an extra harness or other suitable means is employed to ensure that the child seat's backrest is secured in a similar manner to that which is achieved by means of a three-point seat belt.

The child's seat may have different arrangements or devices to secure the seat belt in the above-mentioned horizontal positions.

For securing a first portion of the seat belt, in a preferred embodiment the child seat's backrest has L-shaped slots in the backrest's side portions. The seat belt is passed through the slot's opening until the width of the seat belt fills the lowest part of the slot and the seat belt achieves a horizontal positioning over the backrest. By means of this method of attaching the seat belt to the backrest, the object is achieved that the seat belt is placed approximately on a level with the part of the backrest that is closest to the car seat. By positioning the seat belt in this fashion, a stable and uniform

attachment is achieved relative to the car seat. If the car seat belt is used in addition for attaching the child's seat, which is arranged so as to be self-tightening, the forward movement of the child's seat will be reduced to a minimum.

5 It may also be appropriate to have different designs for portions of the side supports for attaching the seat belt, such as cut-outs with a width corresponding to the width of the seat belt where the seat belt can be located and secured by, for example, articulated locking devices. There are a great many possibilities here with regard to different methods of positioning and
10 securing the seat belt. It is therefore left to those who are skilled in the art to decide which design or device is best suited to the attachment of the seat belt to the backrest in each individual case.

In a preferred embodiment the seat belt's second portion is kept in position under the child seat's sitting portion by the seat belt being stretched over the
15 child seat's base in the horizontal position. According to a preferred embodiment of the invention the base will slant inwards, while the sitting portion projects slightly out over the base, thereby forming a natural stopper for the seat belt's second portion. In those cases where the sitting portion does not project out over the base or if extra attachment devices are required
20 for safety reasons, these can easily be attached to the base of the child's seat. The necessity for attachment devices is a matter to be decided by the expert in each individual case and several types of design of such attachment devices can be envisaged. It may also be appropriate to equip the base with a groove or a cutout that secures the second portion of the seat belt in the
25 desired horizontal position.

For adjusting the child's safety harness the child seat's backrest is provided with through-going cutouts extending in the backrest's longitudinal direction and with a width corresponding substantially to the width of the child seat's safety harness. In an embodiment of the invention, the cutouts at the front of
30 the backrest are covered by flexible cloth material, possibly with slots marking the adjustment device's fixed locking positions.

The rear of the child seat's backrest is designed with at least two projecting portions where in each portion there are provided respective locking grooves. The adjustment device is mounted between the projecting portions.
35 According to a preferred embodiment of the invention the adjustment device

may be equipped with lead devices, which are arranged in engagement with the projecting portions' locking grooves and which can be moved along them. The locking grooves may be designed in such a manner that there are individual portions of the locking grooves where the adjustment device can be securely locked preferably by means of its lead devices, or alternatively the locking grooves may be arranged in such a manner that the adjustment device can be securely locked along the entire length of the locking groove. This may be achieved, for example, by the portions that are arranged for locking being placed at short intervals or the locking groove being provided as a rail. The use may also be envisaged of Velcro for locking the adjustment device in a fixed position.

According to the invention the adjustment device is designed with a support portion for the child's safety harnesses and a gripping portion that is used when moving the adjustment device in the locking grooves. The child's safety harnesses are passed through the backrest's through-going cut-outs and are passed on over the adjustment device's support portion, before the safety harness is passed on along the backrest and on towards the child seat's sitting portion.

When the safety harness's height over the child's shoulders has to be adjusted, only a simple movement is required to take hold of the adjustment device's gripping portion. The adjustment device is moved up or down the locking groove until the desired height is reached, whereupon the adjustment device is locked in the desired position in the locking groove.

The gripping portion may assume different forms and the gripping portion illustrated in the attached drawings is only an example of a type of design.

The adjustment device according to a preferred embodiment of the invention is designed in such a manner that the position/height of both the safety harnesses resting over the child's shoulder portion are adjusted simultaneously. If so desired, it will be possible to employ the adjustment device according to the invention for separate adjustment of the height of each of the safety harnesses.

The invention will now be described in greater detail with reference to the attached figures 1-3.

Figure 1 is a perspective view of a child's seat illustrated attached by means of a three-point seat belt.

Figure 2 is a perspective view of the adjustment device.

Figure 3 illustrates a section through the adjustment device viewed from
5 above.

In the figure a child's seat 1 is illustrated that has to be employed during transport of a child by car. The child's seat 1 is placed in the car seat (not illustrated in the figure) either in front or back seats and a seat belt preferably of the three-point type is arranged over the front of the child's seat, as
10 illustrated in figure 1.

In this fastened position a first portion 3 of the seat belt will extend substantially horizontally positioned over the child seat's backrest 4. As the figure illustrates, an attempt will be made to arrange the seat belt's 2 first portion 3 along a portion of the backrest's bottom 4' in order to obtain a
15 uniform and stable attachment against the car seat. If for various reasons it proves to be difficult to arrange the seat belt's 2 first portion 3 in contact with the backrest's bottom 4', the first portion 3 is arranged as horizontally as possible over the child seat's backrest 4, but in this case often at a greater distance from the car seat.

In figure 1 receiving portions are illustrated intended for receiving the first portion 3 of the seat belt. These receiving portions may be in the form of L-shaped slots 8 in the child seat's 1 side portion 7 as illustrated in the figure. The first portion 3 of the seat belt 2 can easily be inserted into the slot 8 and brought into substantially horizontally positioned abutment along the bottom
20 4' of the child seat's backrest 4.

When the child's seat is secured by the seat belt 2, in a preferred embodiment the seat belt's second portion 5 is arranged below the child seat's sitting portion 6. The second portion 5 of the seat belt 2 will preferably extend substantially horizontally positioned over the base 11 of the child's seat.

In a second embodiment of the invention the seat belt's second portion 5 may extend substantially horizontally positioned over the child seat's sitting portion 6, preferably over the lower area of the child seat's sitting portion 6. In the embodiment, the child seat's sitting portion 6 may be equipped with
30

suitable arrangements or devices for receiving the seat belt's 2 second portion 5.

Figure 2 illustrates the adjustment device 12 as it will be mounted to the rear of the child seat's backrest 4. In the figure outwardly projecting portions 13 are illustrated that are designed as an integrated part of the backrest. In an alternative embodiment, the projecting portions may be composed of separate parts that are attached to the backrest. The projecting portions 13 are illustrated provided with locking grooves 14. In the locking grooves illustrated in the figure, certain portions 15 are reserved for locking, while the remaining portions are employed for moving the adjustment device 12 when the locking position has to be altered.

The adjustment device 12 is equipped with a portion 19 suitable for mounting the child seat's safety harnesses 16. The adjustment device 12 further comprises a gripping portion 17 that is employed when the adjustment device's locking position in the locking grooves 14 has to be altered. By manipulating the gripping portion 17 the adjustment device 12 can be moved up or down in the locking groove 6, thus altering the attachment of the child's safety harnesses 16 to the backrest.

In figure 3 the adjustment device's lead devices 18 are illustrated brought into engagement with the locking groove 14, thus enabling the adjustment device 12 to be moved smoothly in the locking groove 14 and moved to lock in the locking portions 15. When the adjustment device 12 is moved in the locking groove 14, portions of the child's safety harnesses 16 are passed over the portion 19, as the child's safety harness 16 is tightened or slackened.

In figure 1 the upper ends of the child's safety harness 16 are illustrated mounted in their respective through-going cutouts 20 in the child seat's backrest, while the safety harnesses' 16 lower ends continue down along the child seat's back portion.

Attachment of the child's safety harnesses on the front of the backrest 4 is illustrated in figure 1. The through-going cutouts 20 are covered in a flexible material 21 provided with slots marking the locking portions 15 along the locking grooves 14.

The adjustment device is not limited to use in a child's seat like that in figure 1, the adjustment device being suitable for use in all types of child's seats where the child's safety harness has to be capable of adjustment.

PATENT CLAIMS

1. A mounting system for attaching a child's seat (1) in a car seat, where a seat belt (2), for example a three-point seat belt that may be self-tightening, is employed for attaching the child's seat,
5 characterised in that a first portion (3) of the seat belt is positioned substantially horizontally over a forwardly facing portion of the child seat's backrest (4) and that the child seat's backrest (4) has receiving portions for receiving the seat belt's first portion (3).
2. A mounting system according to claim 1,
10 characterised in that a second portion (5) of the seat belt is positioned substantially horizontally across or below a forwardly facing part of the child seat's sitting portion (6).
3. A mounting system according to claim 1,
15 characterised in that at least one of the side portions (7) of the child seat's backrest (4) is arranged with receiving portions for receiving a first portion (3) of the seat belt, where the receiving portion may be designed as an L-shaped slot (8) or with at least one recess for receiving a first portion (3) of the seat belt where the seat belt is locked by means of an articulated locking device.
- 20 4. A mounting system according to claim 1, characterised in that the second portion (5) of the seat belt is positioned substantially horizontally over the base (11) of the child's seat and possibly that the base (11) is designed with a groove or recess for receiving a second portion (5) of the seat belt.
- 25 5. A mounting system according to claim 1, characterised in that devices are mounted under the child seat's sitting portion (6) for securing a second portion (5) of the seat belt.
6. A adjustment device for adjusting a child seat's safety harness (16), the child's safety harness being inserted through cut-outs (20) in the child
30 seat's backrest, characterised in that
 - the adjustment device (1) is designed with a gripping portion (17) and a portion (19) for supporting at least one of the child's safety harnesses (16),

- the adjustment device (1) is mounted on the child seat's backrest (4) and can be moved in such a manner that the child's safety harness (16) is arranged in different positions along the child seat's backrest (4).

5 7. A adjustment device according to claim 6,
characterised in that the rear of the child seat's backrest (4) is provided with projecting portions (13), where the individual projecting portion is provided with locking grooves (14).

10 8. A adjustment device according to claim 7,
characterised in that the locking groove (14) is provided with portions that are suitable for locking the adjustment device (12) or that the locking groove is arranged in such a manner that the adjustment device (12) can be locked along the entire length of the locking groove (14).

15 9. A adjustment device according to claim 6,
characterised in that the adjustment device (12) is equipped with at least one lead device (18) that is mounted in the locking grooves.

20 10. A adjustment device according to claim 6,
characterised in that in the child seat's backrest (4) there are provided through-going cut-outs (20) for passing through portions of the child seat's safety harness (16), that the cut-outs (20) at the front of the backrest may be covered by flexible cloth material (21), and possibly with slots marking the adjustment device's fixed locking positions.

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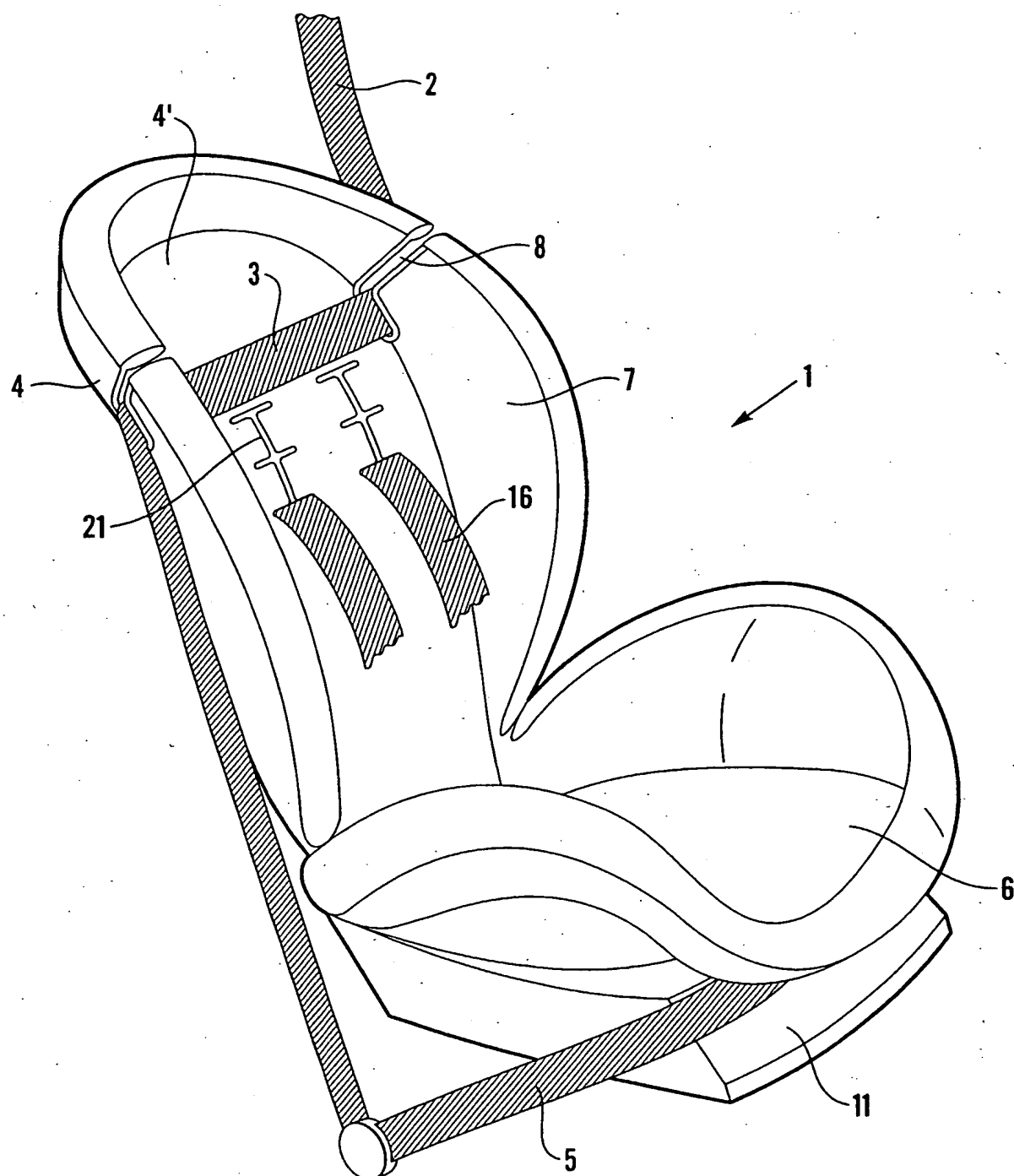


Fig. 1

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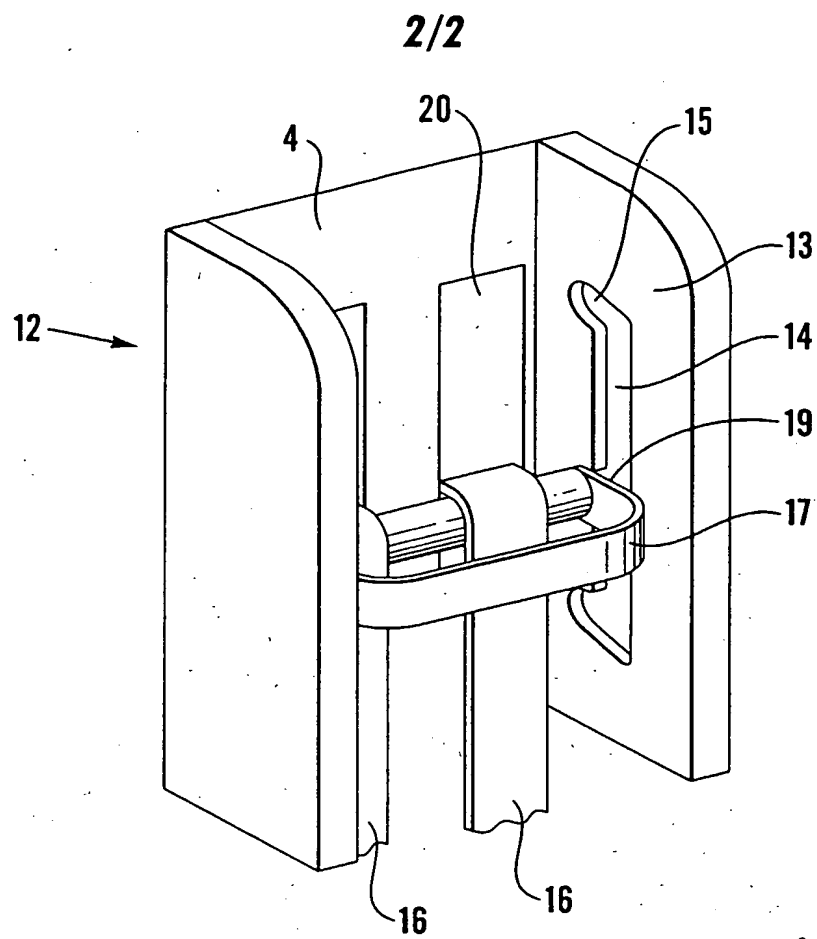


Fig. 2

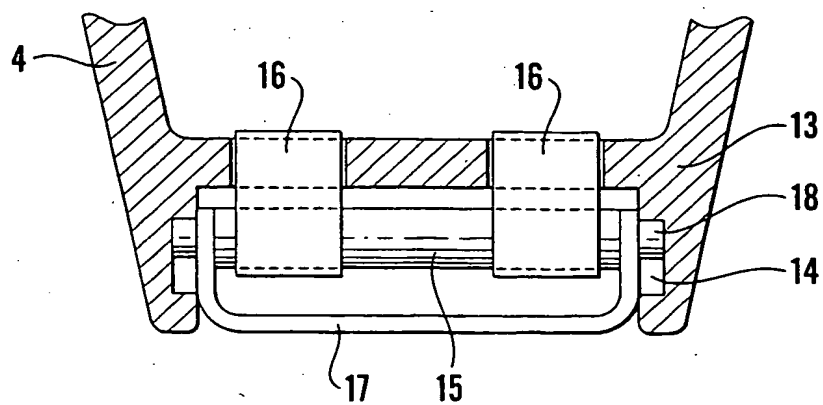


Fig. 3

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